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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/743,133

02/23/2001

Mattias Beck

GLN-005US

4956

7590

02/16/2005

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EXAMINER

LEE, SHUN K

ART UNIT

PAPER NUMBER

2878

DATE MAILED: 02/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/743,133	BECK ET AL.	
	Examiner	Art Unit	
	Shun Lee	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 December 2004 (CoF 18 December 2003).
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-13 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 09 December 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1204</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed on 9 December 2004 does not fully comply with the requirements of 37 CFR 1.98 because: (a) it lacks a legible copy of each foreign patent and each publication or that portion which caused it to be listed, other than U.S. patents and U.S. patent application publications unless required by the Office; (b) each U.S. patent listed in an information disclosure statement must be identified by inventor, patent number, and issue date; (c) each foreign patent or published foreign patent application listed in an information disclosure statement must be identified by the country or patent office which issued the patent or published the application, an appropriate document number, and the publication date indicated on the patent or published application; and (d) each publication listed in an information disclosure statement must be identified by publisher, author (if any), title, relevant pages of the publication, date, and place of publication. Since the submission appears to be *bona fide*, applicant is given **ONE (1) MONTH** from the date of this notice to supply the above mentioned omissions or corrections in the information disclosure statement. **NO EXTENSION OF THIS TIME LIMIT MAY BE GRANTED UNDER EITHER 37 CFR 1.136(a) OR (b).** Failure to timely comply with this notice will result in the above mentioned information disclosure statement being placed in the application file with the noncomplying information **not** being considered. See 37 CFR 1.97(i).

Drawings

2. The drawings were received on 9 December 2004. These drawings are not acceptable since each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

4. The abstract of the disclosure is objected to because of the form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. Correction is required. See MPEP § 1826.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-3 and 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dewey, Jr. *et al.* (US 4,051,371) in view of Admitted Prior Art and Lehmann (US 5,528,040).

In regard to claims 1, 8, and 11-13, Dewey, Jr. *et al.* disclose (Fig. 5) a device for detecting by photoexcitation, a chemical element in a host substance, comprising:

(a) an optical excitation source (14) consisting of a semiconductor laser (column 9, lines 3-28) which emits a beam (13) of light in the direction of a sample of said substance (in enclosure 12), the wavelength (λ_0 in Fig. 2) of which, located in the mid infrared (column 1, lines 22-24), corresponds to an absorption band specific to said element ("A" in Fig. 2); and

(b) a means (23) for detecting and measuring the heating effects of said substance, resulting from the interaction of the element molecules excited by said beam with said host substance molecules (column 1, lines 22-44).

The device of Dewey, Jr. *et al.* lacks that the semiconductor laser is a quantum well laser (*i.e.*, type II quantum well laser, quantum cascade laser, type II quantum cascade laser, or a quantum well laser using materials with low forbidden band energy).

However, semiconductor lasers are well known in the art. For example, applicant admits (pg. 6, line 26 to pg. 7, line 9) that semiconductor laser such as quantum well lasers (*i.e.*, type II quantum well laser, quantum cascade laser, type II quantum cascade laser, or a quantum well laser using materials with low forbidden band energy) are known and disclosed in the cited prior art. As another example, Lehmann teaches (column 7, line 31 to column 8, line 12) that lasers for spectroscopy include quantum well lasers which provide increased spectral coverage. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a known semiconductor laser (such as a quantum well laser) as the optical excitation source in the device of Dewey, Jr. *et al.*, in order to obtain the increased spectral coverage provided by the quantum well laser.

In regard to claims 2 and 3 which are dependent on claim 1, Dewey, Jr. *et al.* also disclose (Fig. 1) that the means (23) for detecting and measuring comprise a microphone (column 3, lines 1-5) which respond to the pressure wave generated by heating the host substance, to produce a representation of the concentration of said element in said substance (column 8, lines 5-18).

In regard to claims **9** and **10** which are dependent on claim 8, Dewey, Jr. *et al.* also disclose (column 7, lines 1-45) it may be desirable to operate in an acoustic resonance mode where that the enclosure (12 in Fig. 5) is of such dimension as to accommodate the acoustic modes resonating at working frequency. Thus, a non-acoustic resonance mode (*i.e.*, where the acoustic wavelength is larger than the enclosure 12) is implied by an acoustic resonance mode.

8. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dewey, Jr. *et al.* (US 4,051,371) in view of Admitted Prior Art and Lehmann (US 5,528,040) as applied to claim 1 above, and further in view of Cong (US 6,087,181).

In regard to claims **4-6** which are dependent on claim 1, the modified device of Dewey, Jr. *et al.* lacks that the means for detecting and measuring the heating effects respond to the host substance refraction index variation resulting from (*i.e.*, due to the pressure wave generated by) the heating (*e.g.*, by measuring the photothermal deflection of a probe beam crossing the sample following emission from a light source), in order to produce a representation of the concentration of said element in said substance. However, photothermal detection spectroscopy is well known in the art. For example, Cong teaches (column 2, lines 7-34) that photothermal detection spectroscopy comprise measurement of local heating as a result laser excitation of analyte (*i.e.*, element) molecules, in order to determine analyte concentration. Cong also teaches (column 2, lines 7-34) that the local heating measurement comprises an acoustic measurement (*e.g.*, photoacoustic spectroscopy) or an optical measurement (*e.g.*,

photothermal deflection, thermal lensing, or interferometry due to host substance refraction index variation resulting from the heating) which comprises a probe beam crossing the sample following emission from a light source. Further, Lehmann teaches (column 3, lines 20-62) that an acoustic measurement requires a quiet acoustic environment. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to perform an optical measurement instead of the acoustic measurement in the modified device of Dewey, Jr. *et al.* when the environment is not acoustically quiet in order to minimize measurement noise due to a noisy acoustic environment by using an optical measurement (e.g., photothermal deflection).

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dewey, Jr. *et al.* (US 4,051,371) in view of Admitted Prior Art, Lehmann (US 5,528,040), and Cong (US 6,087,181) as applied to claim 6 above, and further in view of Frosch *et al.* (US 4,243,327).

In regard to claim 7 which is dependent on claim 6, the modified device of Dewey, Jr. *et al.* lacks that thermal lensing comprises a probe (*i.e.*, sounding) beam co-linear with the light beam and a means of measuring the enlargement of the sounding beam resulting from the change in refraction index of the host substance. However, thermal lensing is well known in the art. For example, Frosch *et al.* teach (Fig. 1) that thermal lensing comprises a probe beam (12') co-linear with the light beam (10') and a means (14) of measuring the enlargement of the sounding beam resulting from the change in refraction index of the host substance (column 5, lines 14-17). Therefore it would have been obvious to one having ordinary skill in the art at the time of the

invention to perform an optical measurement instead of the acoustic measurement in the modified device of Dewey, Jr. *et al.* when the environment is not acoustically quiet in order to minimize measurement noise due to a noisy acoustic environment by using an optical measurement (e.g., thermal lensing).

Response to Arguments

10. Applicant's arguments filed 9 December 2004 have been fully considered but they are not persuasive.

Applicant argues (second paragraph on pg. 9 to second paragraph on pg. 10 of remarks filed 9 December 2004) that Dewey, Jr. *et al.* do not teach or suggest a light beam having a wavelength that is located in the mid infrared and responds to an adsorption band specific of the chemical element of interest in a host substance. Examiner respectfully disagrees. It should be noted that the specification discloses (pg. 6, lines 21-23) that "According to the invention, the source of light 1 is a III/V semiconductor laser, which emits in the mid infrared, in other words, which is capable of working in a wavelength band of between 2 and 12 microns". Thus the instant specification teaches that mid infrared have wavelengths from 2 μm and 12 μm . Dewey, Jr. *et al.* state (column 1, lines 22-24) "It is known to measure trace gaseous constituents using acoustic signals produced by absorption of infrared radiation" and (column 2, lines 14-18) that "A source of a beam of substantially monochromatic radiant energy modulated through a wavelength range embracing spectral lines characteristic of the component to be detected energizes the sample chamber". It should be noted

that infrared is defined¹ as of "or relating to the range of invisible radiation wavelengths from about 750 nanometers, just longer than red in the visible spectrum, to 1 millimeter, on the border of the microwave region". Therefore, Dewey, Jr. *et al.* expressly teach a light beam having a wavelength that is located in the mid infrared and responds to an adsorption band specific of the chemical element of interest in a host substance.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (571) 272-2439. The examiner can normally be reached on Tuesday-Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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